What is claimed is:

1. An industrial large scale process for the selective preparation of acetic acid from a gaseous feed comprising ethane, ethylene or mixtures thereof plus oxygen at elevated temperature, which comprises bringing in a reactor the gaseous feed into contact with a catalyst comprising the elements Mo, Pd, X and Y in gram atom ratios a:b:c:d in combination with oxygen

$$Mo_aPd_bX_cY_d \quad (I)$$

where the symbols X and Y have the meanings:

X is one or more elements selected from the group consisting of Cr, Mn, Nb, Ta, Ti, V, Te and W;

Y is one or more elements selected from the group consisting of B, Al, Ga, In, Pt, Zn, Cd, Bi, Ce, Co, Rh, Ir, Cu, Ag, Au, Fe, Ru, Os, K, Rb, Cs, Mg, Ca, Sr, Ba, Zr, Hf, Ni, P, Pb, Sb, Si, Sn, Tl and U;

the indices a, b, c and d are the gram atom ratios of the corresponding elements, where a=1; b>0; c>0; and d=0.05–2.

2. The process as claimed in claim 1, wherein X and/or Y are a plurality of elements, where, if desired, the indices c and d assume different values for different elements and wherein the sum of the gram atomic ratios of all elements of Y is 0–2.

3. The process as claimed in claim 1, wherein the temperature is in the range from 200 to 500° C.

4. The process as claimed in claim 1, wherein the pressure in the reactor is in the range from 1 to 50 bar.

5. The process as claimed in claim 1, wherein b is in the range from 0.0001 to 0.5.

6. The process as claimed in claim 1, wherein said gaseous feed comprises ethane mixed with at least one further gas.

7. The process as claimed in claim 6, wherein the further gas fed in is nitrogen, oxygen, methane, carbon monoxide, carbon dioxide, ethylene and/or water vapor.

8. The process as claimed in claim 1, wherein the catalyst comprises at least one of the following compositions in combination with oxygen:

$Mo_{1.00}V_{0.25}Nb_{0.12}Pd_{0.0005}$

$Mo_{1.00}V_{0.25}Nb_{0.12}Pd_{0.0004}$

$Mo_{1.00}V_{0.25}Nb_{0.12}Pd_{0.0003}$

$Mo_{1.00}V_{0.36}Nb_{0.03}Sb_{0.01}Ca_{0.01}Pd_{0.0005}$

$Mo_{1.00}V_{0.50}Nb_{0.15}Te_{0.2}Pd_{0.0002}$

$Mo_{1.00}V_{0.25}Nb_{0.3}W_{0.2}Pd_{0.0003}$

$Mo_{1.00}V_{0.25}Nb_{0.3}Sb_{0.1}Pd_{0.0004}$.

9. The process as claimed in claim 1, wherein the catalyst is mixed with a support material or is fixed on a support material.

10. The process as claimed in claim 1, wherein the selectivity of the oxidation reaction to acetic acid is ≧60%, at an ethane conversion of ≧4%.

11. A catalyst for the selective oxidation of ethane, ethylene or mixtures thereof plus oxygen, comprising the

elements Mo, Pd, X and Y in gram atom ratios a:b:c:d in combination with oxygen

$$Mo_aPd_bX_cY_d \quad (I)$$

where the symbols X and Y have the meanings:

X is one or more elements selected from the group consisting of Cr, Mn, Nb, Ta, Ti, V, Te and W;

Y is one or more elements selected from the group consisting of B, Al, Ga, In, Pt, Zn, Cd, Bi, Ce, Co, Rh, Ir, Cu, Ag, Au, Fe, Ru, Os, K, Rb, Cs, Mg, Ca, Sr, Ba, Zr, Hf, Ni, P, Pb, Sb, Si, Sn, Tl and U;

the indices a, b, c and d are the gram atom ratios of the corresponding elements, where a=1; b>0; c>0; and d=0.05–2.

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